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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.           | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------------|------------------|
| 10/717,006  | 11/19/2003  | Jaimes Sher          | 2003B112                      | 6734             |
| 23455   | 7590        | 07/17/2006           | EXAMINER<br>BULLOCK, IN SUK C |                  |
| EXXONMOBIL CHEMICAL COMPANY<br>5200 BAYWAY DRIVE<br>P.O. BOX 2149<br>BAYTOWN, TX 77522-2149 |             |                      | ART UNIT<br>1764              | PAPER NUMBER     |

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 10/717,006             | SHER ET AL.         |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | In Suk Bullock         | 1764                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 April 2006.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,6-14,17-22 and 27-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,6-14,17-22 and 27-33 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 19 November 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION*****Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,441,262 to Fung et al. (hereinafter Fung).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing from about 1-90 wt% methanol and from about 1-99 wt% ethanol, preferably about 1-60 wt% methanol and 40-99 wt% ethanol, and more preferably about 1-30 wt% methanol and about 70-99 wt% ethanol with a molecular sieve catalyst in an alcohol contact zone under conditions effective to produce olefins (e.g., ethylene, propylene). See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol feed may also contain one or more diluents such as water (col. 4, lines 50-67). The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one or more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from MeAPSOs, SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve

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materials (e.g., AEI, CHA, and ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

The alcohol contact zone is deemed to anticipate claims 1 and 6 of the present invention because the alcohol feed contains methanol and ethanol in the amount as discussed above.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7, 8, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung) in view of U.S. Patent 4,994,498 to Kinkade (hereinafter Kinkade).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing from about 1-90 wt% methanol and from about 1-99 wt% ethanol, preferably about 1-60 wt% methanol and 40-99 wt% ethanol, and more preferably about 1-30 wt% methanol and about 70-99 wt% ethanol with a molecular sieve catalyst in an alcohol contact zone under conditions effective to produce olefins (e.g., ethylene, propylene). See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol feed may also contain one or more diluents such as water (col. 4, lines 50-67). The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one or more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact

zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from MeAPSOs, SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve materials (e.g., AEI, CHA, and ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

Fung does not teach syngas conversion process to produce alcohols such as methanol and ethanol and, also, does not teach the claimed weight ratio of ethylene to propylene.

The reference to Kinkade teaches a process for converting syngas to a mixture of lower alkanols (e.g., C<sub>1</sub>-C<sub>4</sub> alcohols) in the presence of a catalyst comprising molybdenum sulfide, an alkali metal compound and a tantalum compound. See Abstract and col. 2, lines 35-48. Carbon dioxide and water among others are by-products of the syngas conversion process (col. 3, lines 20-21).

It is well known and conventional in the art to convert syngas to various alcohols depending on the catalyst and other factors employed such as pressure and temperature. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Fung by including the syngas conversion process as taught by Kinkade because Kinkade has

taught that the catalyst comprising molybdenum sulfide, an alkali metal compound and a tantalum compound exhibits an increase in catalytic activity, an increase in the alcohol production rate, and an increase in selectivity.

With respect to the claimed weight ratio of ethylene to propylene, in light of Fung teaching similar wt% range of each alcohol component, it is expected that the weight ratio of ethylene to propylene produced by the process of Fung would overlap with the present claimed range. Moreover, Fung teaches one may vary the desired olefin product by employing greater proportion of the corresponding alcohol in the feed (e.g., greater proportion of ethanol results in additional ethylene in the olefin product). See specifically col. 2, line 66 to col. 3, line 11 and col. 4, lines 26-30.

Claims 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung) in view of U.S. Patent 4,994,498 to Kinkade (hereinafter Kinkade) as applied to claims 7, 8 and 15-17 above, and further in view of U.S. Patent 4,752,263 to Stevens et al. (hereinafter Stevens) and U.S. Patent 6,114,279 to Fukui et al. (hereinafter Fukui).

The teachings of Fung and Kinkade are as discussed above.

Neither Fung nor Kinkade teaches employing a combination of methanol synthesis catalyst and ethanol synthesis catalyst in the syngas conversion process to produce methanol and ethanol.

The reference to Stevens teaches a process for producing mixed alcohols from syngas in the presence of a catalyst comprising Co/MoS<sub>2</sub>, an alkali promoter, and a co-

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catalyst metal selected from Co, Ni, and Fe. The process is highly selective to producing C<sub>2-5</sub> aliphatic alcohols while selectivity to methanol is low. See col. 3, lines 35-45; col. 4, lines 33-41; and col. 5, lines 10-17.

The reference to Fukui teaches a catalyst for methanol synthesis comprising copper, zinc, and aluminum oxides (see Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Fung by utilizing a combination of methanol synthesis catalyst and ethanol synthesis catalyst as claimed because Fukui and Steven has taught that each of these catalysts is individually used to produce specific alcohols from syngas conversion process. Therefore, the use of a combination of them including the claimed combination, in any weight percent including those claimed, would be expected to result in effective methanol and ethanol synthesis.

Claims 18-22 and 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung) in view of U.S. Patent 4,752,263 to Stevens et al. (hereinafter Stevens) and U.S. Patent 6,114,279 to Fukui et al. (hereinafter Fukui).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing from about 1-90 wt% methanol and from about 1-99 wt% ethanol, preferably about 1-60 wt% methanol and 40-99 wt% ethanol, and more preferably about 1-30 wt% methanol and about 70-99 wt% ethanol with a molecular sieve catalyst in an alcohol contact zone under conditions

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effective to produce olefins (e.g., ethylene, propylene). See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol feed may also contain one or more diluents such as water (col. 4, lines 50-67). The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one or more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from MeAPSOs, SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve materials (e.g., AEI, CHA, and ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

Fung does not teach employing a combination of methanol synthesis catalyst and ethanol synthesis catalyst in the syngas conversion process to produce methanol and ethanol.

The reference to Stevens teaches a process for producing mixed alcohols from syngas in the presence of a catalyst comprising Co/MoS<sub>2</sub>, an alkali promoter, and a co-catalyst metal selected from Co, Ni, and Fe. The process is highly selective to

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producing C<sub>2-5</sub> aliphatic alcohols while selectivity to methanol is low. See col. 3, lines 35-45; col. 4, lines 33-41; and col. 5, lines 10-17.

The reference to Fukui teaches a catalyst for methanol synthesis comprising copper, zinc, and aluminum oxides (see Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Fung by utilizing a combination of methanol synthesis catalyst and ethanol synthesis catalyst as claimed because Fukui and Steven has taught that each of these catalysts is individually used to produce specific alcohols from syngas conversion process. Therefore, the use of a combination of them including the claimed combination, in any weight percent including those claimed, would be expected to result in effective methanol and ethanol synthesis.

With respect to the claimed steps of removing water and light ends, these are well known and conventional steps in the syngas conversion process. Moreover, it is well known and conventional to separate light ends such as hydrogen and carbon oxides for recycling purposes (see especially Stevens at col. 6, lines 62-67).

#### ***Terminal Disclaimer***

The terminal disclaimers filed on April 25, 2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on Application Number 10/716,685 and Application Number 10/716,894 have been reviewed and is accepted. The terminal disclaimer has been recorded.

***Response to Arguments***

Applicants' arguments filed April 25, 2006 have been fully considered but they are not persuasive.

Applicants argue that Fung employs two reaction zones whereas the present claimed invention employs one reaction zone to achieve similar results is not persuasive because the claims as presently recited does not exclude using two reaction zones.

The arguments that the applied secondary references to Kinkade, Stevens, and Fukui do not simplify the overall process of Fung is not convincing because these cited references were applied for their teachings of methanol/ethanol synthesis.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to In Suk Bullock whose telephone number is 571-272-5954. The examiner can normally be reached on Monday - Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Calderola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

I.B.



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